



LOW-COST METHODS TO REDUCE BIRD COLLISIONS WITH GLASS

Every year, nearly one billion birds collide with glass in the U.S. While most people consider bird collisions with glass to be an urban phenomenon involving tall, mirrored-glass skyscrapers, the reality is that 56% of collision mortality occurs at low-rise buildings (i.e., one to four stories), 44% at urban and rural residences, and <1% at high-rise buildings (Loss et al. 2014). Many government facilities and refuge visitor centers fit the description of the buildings involved in most bird collisions.

Fortunately, low-cost, attractive solutions are available to building owners and managers. Recent research quantifying the loss of nearly three billion birds in North America over the last 50 years deserves a strong response from federal agencies and an increased focus on tangible actions that result in measurable conservation outcomes, such as reducing bird collisions with glass.



The U.S. Fish and Wildlife Service helped fund a bird-safe window retrofit demonstration at the Oregon Museum of Science and Industry.



TREATMENTS

Lethal Illusions

Birds do not see clear or reflective glass. Glass creates a lethal illusion of clear airspace.

The majority of collisions occur during the day when birds can see reflections of the landscape in the glass (e.g., clouds, sky, vegetation, or the ground); or birds see through glass to real or perceived habitats (e.g., potted plants or vegetation inside buildings). During inclement weather, migrating birds can be attracted to lighted buildings, resulting in collisions, entrapment, excess energy expenditure, exhaustion, resulting in concentrated avian mortality events at night.

Daytime collisions are reduced by using glass treatments that allow birds to see glass as a barrier. Glass treatments should be applied up to the third floor, or up to the height of the adjacent vegetation. However, applying treatments to just first story windows or known problem glass can make an important difference. Nighttime collisions are reduced by minimizing interior and exterior lighting, especially during migration seasons.

Glass Treatments

A variety of glass and window treatment options are available to create visual barriers for birds thereby reducing mortality from collisions. Vertical stripes that are at least ¼ inch wide with a maximum spacing of 4 inches, or horizontal stripes that are at least ¼ inch wide with a maximum spacing of 2 inches, have been effective at preventing glass strikes of most birds. Because hummingbirds are so much smaller than other birds, closer spacing of the elements of any pattern (striped or otherwise) will be necessary.

Additionally, when using patterns other than stripes, closer spacing of elements is recommended because a series of smaller images like dots will not break up the glass as much as stripes using the 2" X 4" spacing rules. Use colors that contrast well against the background or reflections (e.g., white stripes may be more effective than black stripes if there is a consistent reflection of dark color on the glass surface). Applying a product to the outer surface of the glass is most effective.

Applying a product to inner surfaces can be effective if the outer surface is not so reflective that the pattern beneath is invisible to birds; this is only recommended where external treatment is not possible.

ACOPIAN BIRD CURTAIN/ZEN CURTAIN



Paracord treatment on University of Chicago glass.
Photo: Acopian BirdSavers

Cost: 11 cents/sq. ft. for materials

Many consider the Acopian bird or Zen bird curtain to be an elegant and simple method of reducing bird collisions with glass. This method uses 1/8-inch paracord sections spaced 3.5 to 4.25 inches apart, hanging the height of the window and attached to a horizontal section of paracord running along the top frame of the window. The paracord creates a visual barrier for birds.

Acopian curtains can be purchased pre-made, or constructed of readily available and inexpensive materials.

www.birdsavers.com



TREATMENTS

PAINT



Stripped glass pattern. Photo: Christine Sheppard, American Bird Conservancy

Cost: 13 cents/sq. ft. for materials

Using the spacing guidelines previously described, non-toxic tempura paint patterns or artwork applied to exterior glass can reduce bird collisions for extended time periods. When needed, tempura paint is easily removed using vinegar and water.

SCREENS AND NETTING

Cost: varies based on materials, approximately \$1.83/ sq. ft.

External insect screens or netting on windows is an effective and relatively inexpensive treatment to reduce the visual reflection in the glass, and might also help prevent some injuries by providing a cushion between the bird and the window. This treatment can be installed on individual panes or attached to a façade. To be effective, the netting must be placed far enough in front of the window that a bird hitting it will not collide with the glass behind the net after hitting it. The netting should have openings no larger than 1/2 inch and it must be completely taut so that birds do not get trapped in it.

Several companies sell screens or barriers that can be attached with suction cups or eye hooks. These treatments can be used on new construction, renovations, and retro-fits.

www.birdscreen.com



Netting installed on slanted wooden beams. Photo: USFWS

TAPE AND DECALS

Cost: Tape is \$2.50/sq. ft., dot patterns are \$8/sq. ft. for materials

Bird friendly patterns can be adhered to glass using tape and decals. Tape and decals are often available in a variety of colors and tints as well as clear. Adhesive dot patterns are available.

www.collidescape.org



Dot pattern applied to exterior of National Renewable Energy Laboratory (NREL). Photo: Dennis Schroeder, NREL 31193



TREATMENTS

EXTERNAL FILMS AND COVERINGS

Cost: External films and coverings are \$4-6/sq. ft. for materials; double that to include labor.

There are several effective external film and glass covering options. Some options are more expensive, but are highly effective. They only have a guaranteed lifetime of 5 to 7 years, although they often last longer.



Before and after window film was applied to the Ding Darling Education Center at the J.N. "Ding" Darling National Wildlife Refuge. Photos: USFWS

NIGHTTIME LIGHTING (CONTINUED ON NEXT PAGE)

Cost: Not only is the elimination or reduction of unnecessary lighting one of the easiest ways to reduce collisions, it also saves energy and reduces costs. Motion sensors and light down shields involve a modest initial investment and result in cost savings.

Light minimization is especially important during the bird migration periods (early April through late May and mid-August through early November), and periods of inclement weather. Combined with glass treatments, reducing nighttime lighting can save birds.



(Left) Waterfowl hunters begin to line up at the "check-in" shack on the southern end of the Sacramento refuge to sign up for the opening day hunt blind lottery held later that night. Credit: Jon Myatt/ USFWS3



TREATMENTS AND COMMUNICATION

NIGHTTIME LIGHTING (CONTINUED)



Wood thrush/Creative Commons



White-throated sparrow/Creative Commons



Canada warbler/Creative Commons

To eliminate and reduce unnecessary nighttime lighting:

1. Extinguish lights or install motion sensors on all lights (both interior and exterior) that activate only when people are present. Motion sensors are inexpensive and save energy;
2. Use window coverings to reduce bird attraction to lighted buildings;
3. Ensure all exterior lighting is “fully shielded” so that light is prevented from being directed skyward. “Fully shielded” light fixtures are defined as those with an opaque shield so that all light is only emitted downward below the lowest light emitting part of the fixture. “Fully shielded” is the same as “zero up light” and “dark sky compliant;” and,
4. Comply with current Federal Aviation Administration (FAA) marking and lighting guidance on obstructions (ensure that required obstruction lighting includes only L-864 flashing lights with appropriate flash rates, and non-flashing L-810 lights extinguished or reprogrammed to flash). For more information, see: <https://www.audubon.org/conservation/project/lights-ou>

COMMUNICATION

Federal agencies, especially where we have visitors at refuges and fish hatcheries, have an opportunity to share information with the public about effective ways to reduce bird collisions. We encourage you to develop interpretive information to share what measures you take at your facility and why it is important for bird conservation.

Agencies have an opportunity to address the magnitude of bird losses with tangible actions that result in measurable conservation outcomes. Retrofitting building glass is a cost-effective technique that reduces bird collisions and brings us a step closer to reducing the loss of migratory birds.